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EXAMINER	
RICHARDSON, THOMAS W	

ART UNIT	PAPER NUMBER
2109	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/760,011

Applicant(s)

KAO, SU-HWA

Examiner

Thomas Richardson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20 January 2004.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

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DETAILED ACTION

This Office Action is in response to US Patent Application number 10/760011 filed on January 20, 2004.

Claims 1-16 are pending.

Claims 1-16 are rejected.

Drawings

1. The drawings are objected to because of apparent misspelling of the word "processor" in Figure 4. Reference number 401 on Figure 4 reads "data processon", and appears in specification as "data processor". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of

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any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: the word "productively" appears on page 1, line 20, which appears to be a misspelling of the word "productivity".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 9, 10, 11, 13, 15, and 16 rejected under 35 U.S.C. 102(e) as being anticipated by US Patent 7 177 790, Hansen.

3. As per claim 1, Hansen teaches an apparatus for managing and transporting virtual disks over a network to networked stations comprising a data storage subsystem and at least one data processor connected thereto via a network [abstract, Figure 1, and accompanying description, wherein client computer accesses files on host computer],

said data processor includes a virtual disk interface controller to interface with said storage subsystem in handling the input and output for said storage subsystem [column 3, lines 34 forward, wherein the UDP encapsulation device provides means for the transport of data packets between the client and host computers], and

said storage subsystem manages a pool of storage blocks in the form of a plurality of virtual disk images and transports the virtual disk images over the network to said virtual disk interface controller [column 3, lines 8-20, wherein the plurality of disk images is shown by emulation of RAM or other storage memory (line 17), and the image packets are transferred over the network to other computers (line 8)],

wherein each virtual disk image transported via the network is emulated as a virtual disk by said virtual disk interface controller and presented to said data processor [column 2 lines 62 forward, wherein the computer receives virtual disk packets so as to load an operating system, which is presented to the main data processor as a disk image].

4. As per claim 3, Hansen teaches the apparatus for managing and transporting virtual disks over a network to networked stations as claimed in claim 1, wherein said data processor further includes a disk interface [Figure 4 and accompanying description, wherein the North Bridge as described in column 4 lines 21 forward acts as an interface between the processor and the NIC card on the client device], a virtual disk emulated by said virtual disk interface controller is presented to said data processor via

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a disk interface bus to said disk interface as response to said data processor [column 4, lines 29 forward describe the bus connection between said North Bridge and other peripheral devices, such as receiving NIC card].

5. As per claim 9, Hansen teaches the apparatus for managing and transporting virtual disks over a network to networked stations as claimed in claim 1, wherein said apparatus is to operate within and on a computer system comprising the hardware components of at least one main processor and at least one storage device [abstract, Figure 1, and accompanying description, wherein the actions are all taken on computer systems].

6. As per claim 10, Hansen teaches a data processor for managing and transporting virtual disks over a network to networked stations, comprising:

a virtual disk interface controller to interface with a storage subsystem having a plurality of virtual disk images in handling the input and output for the storage subsystem [column 3, lines 34 forward, wherein the UDP encapsulation device provides means for the transport of data packets between the client and host computers]; and

a disk interface, a virtual disk image emulated by said virtual disk interface controller is presented to said data processor via a disk interface bus to said disk interface as response to said data processor [Figure 4 and accompanying description, wherein the North Bridge as described in column 4 lines 21 forward acts as an interface between the processor and the NIC card on the client device], a virtual disk emulated by said virtual disk interface controller is

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presented to said data processor via a disk interface bus to said disk interface as response to said data processor [column 4, lines 29 forward describe the bus connection between said North Bridge and other peripheral devices, such as receiving NIC card].

7. As per claims 4 and 11, Hansen teaches the apparatus and data processor for managing and transporting virtual disks over a network to networked stations as claimed in claims 1 and 10, said virtual disk interface controller further comprising:

a data storage device interface for capturing and interpreting the data access requests via a disk interface bus, then converting the interpreted requests for sending back to said data processor [column 4, lines 7 forward, wherein the North Bridge facilitates and manages communication between the data processor and the other elements];

and a network interface for conducting data storage interfacing via the network with said data storage subsystem [column 4, line 33, wherein the network (NIC) card is described as being connected to the North Bridge by a bus].

8. As per claim 13, Hansen teaches a method for managing and transporting virtual disks over a network to networked stations, comprising the steps of: (a) managing a pool of possibly scattered and shared storage blocks in the form of a plurality of virtual disk images [column 2, lines 61 forward, column 3, lines 8 forward, wherein the host computer manages disks for client computers], (b) transporting selected virtual disk images over the network to a plurality of connected diskless computers [column 2, lines 61 forward, column 3, lines 8 forward, wherein the host computer transports the data as

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virtual disk packets to client computers] and (c) seamlessly emulating the transported virtual disk image as a disk image to the computer that requests access to the virtual disk image [column 3, lines 58 forward, wherein the client computer can access the virtual drive and use it in place of a physical drive].

9. As per claim 15, Hansen teaches the method for managing and transporting virtual disks over a network to networked stations as claimed in claim 13, wherein a disk image in the step (c) is transparently subject to local hard disk manipulation utilities for making partitions, creating file system or configuring for bootstrapping [column 3, lines 13 forward, wherein the host computer may convert virtual disk packets into read and write commands to one or more physical storage devices].

10. As per claim 16, Hansen teaches the method for managing and transporting virtual disks over a network to networked stations as claimed in claim 13, wherein each emulation unit in the step (c) performs the function of a disk emulator that serves as a local disk device to its host computer [column 2 lines 52 forward, wherein the virtual disk images may take the place of local physical drives and be used as such], and the communication between a disk emulation adaptor and a disk image server is via a network protocol for transporting packets that encapsulate disk access requests and results [column 4, lines 7 forward, wherein the data packets are sent via the network interface as encapsulated according to the UDP protocol].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2, 7, and 8 rejected under 35 U.S.C. 103(a) as being unpatentable over US 7 177 790, Hansen as applied to claim 1 above, and further in view of US 6 985 827, O'Brien, et al.

11. As per claim 2, Hansen teaches the apparatus for managing and transporting virtual disks over a network to networked stations as claimed in claim 1, wherein said storage subsystem further comprises a plurality of data storage devices, where each data storage device contains data blocks that are constructed into a plurality of virtual disk images by said virtual disk image manager under the instruction from a user interface (Column 2 lines 48-51, wherein a the host computer serves to host one or more programs for downloading to other computers. These programs are served as virtual disks to the computer, as sown in column 2, lines 61-63. Also, column 3, lines 12-20, where the host computer may write to one or more physical devices and can also emulate a plurality of memory types).

O'Brien teaches similar system adding the limitations that Hansen does not teach wherein said storage subsystem further comprises a virtual disk image manager (Column 8 lines 43-46, where the databases provide a map of the data stored in the disk array), and a virtual disk image transporter,

said virtual disk image transporter accesses a data storage device for said data blocks comprising the selected virtual disk image via a map maintained by said virtual disk image manager and communicates with said virtual disk interface controller via the network (Column 8, line 38, where the transaction processor controls and operates the access of the data in the in the disk arrays with via the databases).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine these two devices because the resulting combination would increase the speed at which the information could be accessed and sent. This motivation is presented in O'Brien column 8, lines 47-65.

12. As per claim 7, the combination of Hansen and O'Brien teaches the apparatus for managing and transporting virtual disks over a network to networked stations as claimed in claim 2, wherein said data storage subsystem further includes a cache memory for storing most recently used blocks for said data processor (The system described by O'Brien teaches this limitation. Column 8, lines 32-36 shows that the EJB cluster presented in the device contains a cache of common resources and data objects).

A person of ordinary skill in the art at the time of the invention would have found it obvious to add this feature for an increase in the speed and efficiency of the system. Adding a cache for data that is shared or often used would allow it to be accessed and sent out faster, lowering the time of transferring data and allowing more time to be used productively by each device.

13. As per claim 8, the combination of Hansen and O'Brien teaches the apparatus for managing and transporting virtual disks over a network to networked stations as claimed in claim 2, wherein said data storage subsystem further includes a selection unit to select one of said virtual disk images via the map maintained by said virtual disk image manager (The system described by O'Brien, et al teaches this limitation. Column 8, lines 37-46 teach a transaction processor which accesses the data contained in the disk arrays by using information of that data held in the databases).

A person of ordinary skill in the art at would have found it obvious at the time of the invention to include this as it would further allow for greater speed and efficiency in the system. O'Brien, column 8, lines 47-65, gives reasoning for mapping data into disks, and accessing the data via the map contained in the data, which allows the information to be handled and processed more quickly.

Claims 6 and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over US 7 177 790, Hansen as applied to claim 13, in further view of US 6 985 927, O'Brien, et al and US 6 182 088, Kawakami, et al.

14. As per claim 6, the combination of Hansen and O'Brien teaches the apparatus for managing and transporting virtual disks over a network to networked stations as

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claimed in claim 2. Kawakami teaches a system wherein each virtual disk image comprises a set of sequentially numbered blocks of data storage of predetermined fixed size (In Kawakami's system data blocks are arranged in a predetermined fixed size and mapped, as shown in Figures 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use Kawakami's block arrangement in Hansen's system, as it would allow data to be accessed and processed faster and more efficiently [abstract])

15. As per claim 14, Hansen teaches the method for managing and transporting virtual disks over a network to networked stations as claimed in claim 13. Hansen's system does not teach a system wherein the step (a) further comprises the steps of:

(a1) creating said plurality of virtual disk images in block format, each virtual disk image comprising a set of sequentially numbered blocks of data storage of predetermined fixed size (Kawakami teaches this limitation, creating a fixed file size and format [abstract, Figures 2 and 3, and accompanying description]);

This file system allows the data to be accessed and processed faster and more efficiently, as described by Kawakami in column 3, lines 33-35. It would have been obvious to one of ordinary skill in the art at the time of the invention to include this file system to further enhance the efficiency of the system as described in Hansen

(a2) accessing data blocks of selected virtual disk from said virtual disk images via a map maintained by a virtual disk image manager. (O'Brien teaches this limitation in column 8, lines 37-46, wherein the data in the disk arrays is

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accessed by the transaction processor by using information of the location held in the databases).

A person of ordinary skill in the art at would have found it obvious at the time of the invention to include this as it would further allow for greater speed and efficiency in the system. O'Brien, column 8, lines 47-65, gives reasoning for mapping data into disks, and accessing the data via the map contained in the data, which allows the information to be handled and processed more quickly.

16. Claims 5 and 12 rejected under 35 U.S.C. 103(a) as being unpatentable over US 7 177 790, Hansen as applied to claims 4 11 above, and further in view of WO 02/084499, Naghshineh, et al.

17. As per claims 5 and 12, Hansen teaches the apparatus and data processor for managing and transporting virtual disks over a network to networked stations as claimed in claim 4 and 11. Naghshineh teaches a system that contains said data storage device interface further comprising:

a storage interface capturing and conversion unit for capturing storage interface commands via the disk interface bus for translation, and the results coming back from said data storage subsystem being converted for sending back to said data processor (Naghshineh teaches a packet buffer, which acts as a capturing unit for the system. When the system acts in Receive or Transmit mode, as described from page 4, line 22 to page 5, line 11, the packet buffer captures the communication between the two systems until the data is fully received).

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It would have been obvious to one of ordinary skill in the art at the time of the invention to include this buffer, as it allows better management and forwarding of packets); and

a storage interface translation unit for translating captured storage interface commands into a storage interface format, and the translated commands being sent via said network interface over the network to said data storage subsystem where data storage accesses take place physically (Naghshineh teaches this limitation, as a local processor described on page 9, lines 6-15. This processor examines and rewrites the packet before it is forwarded either to the CPU or out to the network).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use this, as it would make translation and processing of data simpler and more efficient.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 2005/0021654, Kern, et al discloses a method and system that provides a microprocessor for providing interfaces with simultaneous connection with a local or remote drive.

US 7 155 527, Kanai discloses a disk controller which consolidates management of a plurality of network drives and allows for allocation of storage devices.

US 5 887 164, Gupta discloses a system and method for a computer to use the resources from a host computer, especially in the form of bootstrapping.

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US 2002/0069369, Tremain discloses an apparatus and method for providing one or more computer services to a plurality of customers.

US 2002/0188592, Leonhardt, et al discloses a storage manager that controls data transfers between a storage system and a host processor wherein the data is presented to the processor as a virtual disk.

US 6 606 651, Linde discloses a system where a disk manager runs on the server and performs maintenance tasks to client storage locally.

US 2003/0154267, Camacho, et al discloses a system that manages file access on a storage network containing a plurality of disks and clients.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas Richardson whose telephone number is (571) 270-5006. The examiner can normally be reached on Monday through Friday, 730am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Taghi Arani can be reached on (571) 272-3787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TR



TAGHI ARANI
PRIMARY EXAMINER
9/4/09